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Applicant's or agent's file reference 0236/RP		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/B 03/01247	International filing date (day/month/year) 07.04.2003	Priority date (day/month/year) 05.04.2002	
International Patent Classification (IPC) or both national classification and IPC B01D53/04			
Applicant POLARIS S.R.L. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 31.10.2003	Date of completion of this report 24.06.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer de Biasio, A Telephone No. +49 89 2399-8627 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IB 03/01247

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-14 as originally filed

Claims, Numbers

1-7 filed with telefax on 08.03.2004

Drawings, Sheets

1/2-2/2 filed with telefax on 08.03.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/B 03/01247

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-7
	No: Claims	-
Inventive step (IS)	Yes: Claims	1-7
	No: Claims	-
Industrial applicability (IA)	Yes: Claims	1-7
	No: Claims	-

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. US-A-4.480.393 (D1) discloses a method of desorption and recovery of desorbed compounds including the steps of (see also fig. 2 of D1):
 - generating a recirculation stream of inert gas which passes through the material to be desorbed;
 - heating said stream to a temperature sufficient to cause desorption (cf. col. 7, ll. 2-8);
 - yielding a gas effluent from said recirculating stream of inert gas in such a manner that said recirculated gas keeps a constant pressure;
 - delivering the gas effluents (3) to means (5,6) fit for cooling the gas effluent;
 - cooling the circulated desorption gas enriched with desorbed compounds to cause the condensation of the desorbed compounds (cf. condenser 39).

Although it is not explicitly mentioned in D1 it can be considered as obvious, also considering the temperatures mentioned in D1 (35°F or lower, cf. claim 3), to perform the cooling stage by means of a cryogenic fluid which is forced to evaporate, as is typically the case in a refrigerant circuit.

Thus the method of present claim 1 differs from what is disclosed in D1 essentially in that part of the vaporized cryogenic fluid, used to condense the desorbed components, is fed to the recirculating gas stream and that the cryogenic fluid is nitrogen.

D1 constitutes the preamble of claim 1 and appears to be the most relevant prior art document cited in the search report. In D1, just alike the present application, only a part of the recirculation stream is cooled to obtain the condensation of the desorbed compounds, thus allowing to operate with smaller cooling powers.

In the present application, however, cryogenic fluid is injected into the recirculation stream. Said cryogenic fluid, not having been brought into contact with the desorbed compounds, should be cleaner than the inert gas reinjected in D1 (see D1, figure 2, stream 43). The desorption process should be improved. As none of

the other prior art documents (see items 2-5) discloses this feature, an inventive step (Art. 33(3) PCT) can be acknowledged as well to the method of claim 1 as to the device of claim 6 (Art. 56 EPC).

2. US-A-4.421.532 (D2) also discloses a method for desorption and recovery of desorbed compounds, including the steps of:
 - generating a recirculation stream of inert gas which passes through the material to be desorbed (cf. claim 1, item (2));
 - heating said stream to a temperature sufficient to cause desorption (cf. claim 1, item (2)(a)(b));
 - cooling the circulated desorption gas enriched with desorbed compounds to cause the condensation of the desorbed compounds (cf. claim 1, item (2)(c)(d)).
3. A further document disclosing a similar method is US-A-5.779.768 (D3) cited in the present application. A recirculation stream of purge gas is heated to desorb the adsorbed compounds which are subsequently separated by condensation. The cooling fluid used to obtain the condensation is not mixed with the recirculation stream.
4. Also DE-A-19503052 (D4) also relates to such a method (see figure). No further details are given about the condensing unit 6.
5. US-A-4.043.770 (D5) shows a process for purifying a hydrogen stream from impurities like methane by adsorption. Hydrogen itself is also used as cryogenic gas that makes the desorbed compounds condense after desorption and is mixed with the desorbed compounds. In D5, however, there is no recirculation stream.